



Mind Fitness: Improving operational effectiveness and building warrior resilience

By Elizabeth A. Stanley and
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Today's complex, fluid, and unpredictable operational environment both demands more from the military in terms of mission requirements and exposes troops to more stressors and potential trauma than ever before. On the one hand, situational awareness, mental agility and adaptability are characteristics that the military wants to cultivate to succeed in such complex environments. In part, this complexity comes from the number and nature of the different missions the military must concurrently fill. The military needs to be able to mix offensive, defensive and stability operations conducted along multiple lines of operations, without the benefit of a clearly demarcated "frontline." Many Soldiers liken this complexity and unpredictability to "the faucet," that is, needing to adjust to situations that could change from cold to hot instantaneously. Moreover, service members must navigate morally ambiguous situations with balance

and non-reactivity, while drawing on stores of cultural awareness to "win hearts and minds." Finally, these missions require that decision making be pushed down to the most junior levels, as the doctrine of "distributed operations" makes clear. Such challenges require a tremendous amount of attentional capacity, self-awareness, and situational awareness.

On the other hand, because of the stressors and challenges of this operating environment, the U.S. military is showing signs of strain. In 2007, the Army experienced its highest desertion rate since 1980, an 80 percent increase since the United States invaded Iraq in 2003. The warning signs of future retention problems are increasingly apparent: suicide, post-traumatic stress disorder, substance abuse, divorce, domestic violence, and murder within the force are on the rise. Recent attention has focused on the growing number of suicides, with the Marine Corps experiencing more suicides in 2008 than since the war began and the Army logging its highest monthly total in January 2009 since it began counting in 1980. Not surprisingly, post-traumatic stress disorder rates are highest among Iraq and

Afghanistan veterans who saw extensive combat (28 percent). However, military health care officials are seeing a spectrum of psychological issues, even among those without much combat experience. Various surveys provide a range of estimates, with up to half of returning National Guard and Reservists, 38 percent of Soldiers and 31 percent of Marines reporting mental health problems. [Consult L. Baldor's "Army desertions surge in past year" (*San Jose Mercury News*); "Mental Health Problems, Use of Mental Health Services, and Attrition from Military Service after Returning from Deployment to Iraq or Afghanistan" by C.W. Hoge et al. in the *Journal of the American Medical Association*; "Longitudinal Assessment of Mental Health Problems among Active and Reserve Component Soldiers Returning from the Iraq War" by Charles S. Milliken et al. in the *Journal of the American Medical Association*; "Alcohol Abuse Rises among Combat Veterans: Study" (Reuters); "Divorce Rate Up in U.S. Army, Marine Corps" (Associated Press); A. Keteyian's "Suicide Epidemic among Veterans," (CBS News); Tony Perry's "Marine suicides in

2008 at a yearly high since Iraq invasion” (*The Los Angeles Times*); Lizette Alvarez’s “Army Data Shows Rise in Number of Suicides” (*The New York Times*); “Across America, Deadly Echoes of Foreign Battles” by D. Sontag and L. Alvarez (*The New York Times*); *Invisible Wounds of War: Psychological and Cognitive Injuries, Their Consequences, and Services to Assist Recovery*; and Office of the Surgeon Multi-National Force–Iraq, Office of the Command Surgeon and Office of the Surgeon General United States Army Medical Command, Mental Health Advisory Team.]

It is no wonder. Troops manning checkpoints or on patrol have to make split-second decisions on when to use lethal force, and veterans say fear often clouded their judgment. As Army SGT Dustin Flatt put it, “The second you left the gate of your base, you were always worried. You were constantly watchful for IEDs [improvised explosive devices]. . . . If you’ve been in firefights earlier that day or week, you’re even more stressed and insecure to a point where you are almost trigger-happy.” (See “The Other War” by C. Hedges and L. Al-Arian in the July 30-Aug. 30, 2007 edition of the *The Nation*.) The perpetual uncertainty is mentally exhausting and physically debilitating, and often its effects linger even after returning home.

What can be done to enhance the military’s capacities to operate in such complex environments while simultaneously protecting against the stressors inherent in them? This article proposes a new training program for both improving operational effectiveness and building resilience to the stressors of deployment: mindfulness-based mind fitness training (MMFT, pronounced M-Fit). This program includes techniques and exercises that previous research in civilians has demonstrated to be effective at enhancing the capacities central to mind fitness, such as mental agility, emotion regulation, attention and situational awareness. Importantly, these exercises appear to achieve improvements in mind fitness by changing brain structure and function so that brain processes are more efficient. Our pilot research, conducted in pre-deployment Marine Reservists, suggests that mindfulness-based mind fitness training is similarly successful at bolstering mind fitness and building resilience against stressors in a military cohort. Drawing on the well-documented theory of neuroplasticity, which asserts that

experience changes the brain, this article argues that mind fitness training could complement the military’s existing stress inoculation training by developing skills to promote resilience against stress and trauma so that warriors can execute their missions more effectively.

Stress can degrade performance. A variety of research indicates that harmful conditions such as chronic stress, neglect and abuse can produce harmful changes in the brain. (See *Does Stress Damage the Brain? Understanding Trauma-related Disorders from Mind-Body Perspective* by Douglas Bremner and *The Trauma Spectrum: Hidden Wounds and Human Resiliency* by Robert Scaer) Stress is produced by real or imagined events that are perceived to threaten an individual’s physical and mental well-being. Today, stress is commonly understood to mean external events or circumstances, and as a result, we tend to think of stress as something external to us. However, stress is actually a perceived, internal response. The right

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amount of stress will allow a decision maker to function at peak performance. However, excessive stress has biological and psychological consequences that reduce the capacity to process new information and learn. Stress may also bias decision making more toward reactive, unconscious emotional choices.

Recent empirical research about decision making in stressful military environments demonstrates that trauma and stress lead to deficits in cognitive functioning. One large study of Army troops found that Soldiers who served in Iraq were highly likely to show lapses in memory and an ability to focus, a deficit that often persisted more than two months after they arrived home. (See “Neuropsychological outcomes of Army personnel following deployment to the Iraq War” by Jennifer J. Vasterling et al. in the *Journal of the American Medical Association* which was published in 2006.) In the study, 654 Soldiers who deployed to Iraq between April 2003 and May 2005 did significantly worse in tasks that measured

spatial memory, verbal ability and the ability to focus than 307 Soldiers who had not deployed. In contrast, the Soldiers who had deployed outperformed those who had not in terms of quick reaction time (for example, how long it takes to spot a computer icon and react). In effect, the deployed Soldiers’ brains built the capacity for quick reaction, a function more necessary for survival in Iraq, while experiencing degradation in other mental capacities.

In another study, Soldiers who screened positive for mental health problems after returning home were up to three times more likely to report having engaged in unethical behavior while deployed. (Consult the Office of the Surgeon Multi-National Force–Iraq, Office of the Command Surgeon, and Office of the Surgeon General United States Army Medical Command for additional information.) Such behavior, including unnecessarily damaging private property or insulting or physically harming noncombatants, is obviously counterproductive to winning the confidence of the local population. This finding suggests a strong link between the negative effects of stress, which degrades Soldiers’ capacity to manage their own emotions and thereby control impulsive, reactive behavior and a decrease in their ability to perform their mission effectively.

Other studies of military environments have found substantial degradation in cognitive performance when subjects experience sleep deprivation and other environmental stressors. One recent study of sleep deprivation among Navy SEALs and Army Rangers during a field training exercise demonstrated that the lack of sleep affected troops so badly that after a week they performed worse on cognitive tests than if they were sedated or legally drunk. In this study, the SEALs and Rangers showed severe degradation in reaction time, vigilance, visual pattern recognition, short-term memory, learning and grammatical reasoning skills. (See “Severe decrements in cognition function and mood induced by sleep loss, heat, dehydration and under-nutrition during simulated combat” by Harris R. Lieberman et al. in *Biological Psychiatry* which was published in 2005.)

Another group of studies examined more than 530 Soldiers, sailors and pilots during military survival training, including time in mock prisoner of war camps, to prepare them to withstand the mental and physical stresses

of capture. In these studies, exposure to acute stressors resulted in symptoms of dissociation (alterations of one's perception of body, environment and the passage of time), problem-solving deficits (as measured by objectively assessed military performance), and significant inaccuracies in working memory and spatial memory (as measured by eyewitness identification tests). (See "Accuracy of eyewitness memory for persons encountered during exposure to highly intense stress" by Charles A. Morgan III et al. in the *International Journal of Law and Psychiatry* which was published in 2004 and "Stress-Induced Deficits in working memory and visuo-constructive abilities in Special Operations Soldiers" by Charles A. Morgan III et al. in *Biological Psychiatry* which was published in 2006.) These findings corroborated with other studies that found multi-stressor environments lead to substantial degradation of executive control capacity and cognitive skills, and such degradation has been linked to battlefield errors, such as friendly fire incidents and collateral damage. (See D.R. Haslam's "The military performance of soldiers in sustained operations" in *Aviation, Space and Environmental Medicine* which was published in 1984; "Effects of caffeine, sleep loss and stress on cognitive

performance and mood during U.S. Navy Seal training" by Harris R. Lieberman et al. in *Psychopharmacology* which was published in 2002; K. Opstad's "Circadian rhythm of hormones is extinguished during prolonged physical stress, sleep and energy deficiency in young men" in the *European Journal of Endocrinology* which was published in 1994; "Sustaining Performance during Continuous Operations: The U.S. Army's Sleep Management System" by G. Belenky et al. in the *Pennington Center Nutritional Series*; and *Countermeasures for Battlefield Stressors*.)

Mind fitness training and performance. Optimal combat readiness requires three things: mission essential knowledge and skills, physical fitness and mind fitness. All three components are crucial for equipping warriors to handle the challenges and stressors of deployment. The military devotes substantial resources to the first two categories, both in terms of funding and time on the training schedule. However, there is virtually no focus on mind fitness training today. The Army's Battlemind program is a first effort to raise Soldiers' awareness of the psychological health issues associated with deployment, but Battlemind mostly occurs after Soldiers return home and provides no skills training.

Instead, it introduces them to the cognitive and psychological effects of being deployed, provides psychological debriefing sessions and helps them identify warning signs for when to seek help. In short, the military generally lacks proactive mind fitness training programs designed to give warriors skills that optimize performance and protect against the stressors of deployment.

Most military training is "stress inoculation training" because it exposes and habituates warriors to the kinds of stressors they will face while deployed. Paradoxically, however, as the previous section demonstrates, stress inoculation training depletes warriors' executive control capacity — that is, the mental capacity that allows us to focus on demanding cognitive tasks and/or emotionally challenging situations. As we explain below, mind fitness training may counteract this cognitive degradation that results from stress inoculation training. Therefore, it could complement existing military predeployment training, as it helps warriors to perceive and relate to deployment stressors differently. In other words, mind fitness training may provide "mental armor" to protect troops as they prepare for deployment and experience the stressors of deployment itself.



Optimal combat readiness requires three things: mission essential knowledge and skills, physical fitness and mind fitness. All three components are crucial for equipping warriors to handle the challenges and stressors of deployment. (Photo by SGT Travis Zielinski, U.S. Army)

Just as stress and trauma can functionally and structurally change the brain, so too can training, practice and expertise. The brain of an expert — such as surgeon, taxi driver or musician — is functionally and structurally different from that of a non-expert. In one study of London cab drivers, for example, researchers found that cab drivers have larger hippocampi than matched controls and that the longer an individual worked as a cab driver, the larger the hippocampus. The hippocampus is the brain region that controls conscious memory, obviously needed to navigate London's circuitous streets. These differences in hippocampus size were the result of experience and training as a cab driver, not of preexisting differences in the hippocampal structure. (See "Navigation expertise and the human hippocampus: a structural brain imaging analysis" by E.A. McGuire et al. in *Hippocampus* which was published in 2003.)

The London cab driver study highlights the well-documented theory of neuroplasticity, which states that experience changes the brain. (See *The Mind and the Brain: Neuroplasticity and the Power of Mental Force* by Jeffrey M. Schwartz and Sharon Begley.) Areas of the brain may shrink or expand — become more or less functional — based on experience. In other words, the brain, like the rest of the body, builds the "muscles" it uses most, sometimes at the expense of other abilities. This concept is something athletes, musicians and martial artists have known for a long time: with physical exercise and repetition of certain body movements, the body becomes stronger, more efficient and better able to perform those movements with ease. A similar process can occur with the brain: with the engagement and repetition of certain mental processes, the brain becomes more efficient at those processes. This improved efficiency arises because any time we perform a physical or mental task, the brain regions that serve task related functions show increased neuronal activity. Over time, as we choose to build a new mental skill, the repeated engagement of the brain regions supporting that skill creates a more efficient pattern of neural activity, for example, by rearranging structural connections between brain cells involved in that skill. In other words, experience and training can lead to functional and structural reorganization of the brain.

Thus, there is a profound parallel between physical fitness and mind fitness. Athletes know that with repetition, physical fitness exercises can produce training-specific muscular, respiratory and cardiovascular changes in the body. They know that specific



Just as stress and trauma can functionally and structurally change the brain, so too can training, practice and expertise. (Photo by SrA Julianne Showalter, U.S. Air Force)

training will correspond to specific benefits and promote better recovery from specific injuries. For example, sprints can build fast-twitch muscles, while longer runs can teach the body to burn fat instead of glucose. Similarly, specific mental exercises may allow the mind to become more "fit" and better protected against certain types of challenges by neuroplastic changes in the brain.

Mind fitness in today's operational environment entails having a mind with highly efficient capacities for mental agility, emotional regulation, attention and situational awareness (of self, others and the wider environment). Just as physical fitness corresponds to specific enhancements in the body, mind fitness may correspond to enhancements in specific brain structures and functions that support these capacities. And, like physical fitness, mind fitness may be protective: it may build resiliency and lead to faster recovery from cognitive depletion and psychological stress. We propose that mind fitness can be maintained even in high-demand and high-stress contexts by regularly engaging in certain mental exercises. These exercises engage and improve core mental processes, such as working memory capacity, which lead to a more mentally agile, emotionally regulated, attentive and situationally aware mode of functioning.

This scientific understanding is starting to be recognized and applied with many recent research studies and popular books describing training programs to bolster mind fitness. (See *Train Your Mind, Change Your Brain* by Sharon Begley, *Train Your Brain: 60 Days to a Better Brain* by Ryuta Kawashima and *Train Your Brain: The*

Complete Mental Workout for a Fit and Agile Mind by Joel Levy.) These training techniques have existed for thousands of years, originating in Eastern spiritual traditions. In recent decades, they have been adapted for secular use, including in medical and mental health settings, corporations, prisons, and elementary schools. The most common and well-validated training program is mindfulness-based stress reduction; more than 250 U.S. hospitals offer mindfulness-based stress reduction programs, and more than 50 research articles document its utility in many domains. (See "Attention regulation and monitoring in meditation" by A. Lutz et al. in *Trends in Cognitive Sciences* which was published in 2008 and "Mindfulness Training Modifies Subsystems of Attention" by A.P. Jha et al. in *Cognitive, Affective and Behavioral Neuroscience* which was published in 2007.)

Mind fitness can be enhanced through a variety of training techniques, but the foundational skill cultivated in both MBSR and our MMFT program is called "mindfulness." *Mindfulness* has been described as a process of "bringing one's attention to the present experience on a moment-by-moment basis" (See "Mindfulness and Meditation" by G.A. Marlatt and J.L. Kristeller in *Integrating Spirituality into Treatment: Resources for Practitioners* which was published in 1999.) and as "paying attention in a particular way, on purpose, in the present moment and nonjudgmentally." (See *Wherever You Go, There You Are: Mindfulness Meditation in Daily Life* by Jon Kabat-Zinn.) Mindfulness differs from a more conceptual mode of processing information, which is often

the mind's default way of perceiving and cognizing. In other words, paying attention is not the same thing as thinking, although we often equate the two.

A growing body of empirical scientific evidence supports the efficacy of mindfulness-based interventions. Clinical studies demonstrate that civilian patients who participated in such programs saw improvement in many physical and psychological conditions and reported a decrease in mood disturbance from, and stress related to, these conditions. Similarly, numerous studies have documented how mindfulness training positively alters emotional experience by reducing negative mood as well as improving positive mood and well-being. (See P.C. Broderick's "Mindfulness and Coping with Dysphoric Mood: Contrasts with Rumination and Distraction" in *Cognitive Therapy and Research* which was published in 2005 and Ruth A. Baer's "Mindfulness Training as a Clinical Intervention: A Conceptual and Empirical Review" in *Clinical Psychology: Science and Practice* which was published in 2003.) Mindfulness training has also been shown to increase tolerance of unpleasant physical states, such as pain, (Consult Joshua Grant's presentation "Pain Perception, Pain Tolerance, Pain Control and Zen Meditation" at the Mind and Life Summer Research Institute on June 5, 2007.) produce brain changes consistent with more effective handling of emotions under stress and increase immune functioning. (See "Alterations in brain and immune function produced by mindfulness meditation" by Richard J. Davidson et al. in *Psychosomatic Medicine* which was published in 2003.) Finally, many studies have shown that mindfulness training improves different aspects of attention, which is the ability to remain focused on task-relevant information while filtering out distracting or irrelevant information. (See "Mindfulness Training Modifies Subsystems of Attention" by A.P. Jha et al., "Meditation and attention: A comparison of the effects of concentrative and mindfulness meditation on sustained attention" by E.R. Valentine and P.L.G. Sweet in *Mental Health, Religion and Culture* which was published in 1999 and "Mental Training Affects Distribution of Limited Brain Resources" by Heleen Slater

et al. in *PLoS Biology* which was published in 2007.)

While this research draws from civilian populations, its findings clearly have implications in the military context. These techniques have already been extended to war veterans with post-traumatic stress disorder, and preliminary results from this work suggest a reduction in symptoms. [Consult "Pilot Study of a Mindfulness based Group Therapy for Combat Post-traumatic Stress Disorder (PTSD)" A.P. King et al.] In addition, mindfulness training could help optimize warrior performance by cultivating competencies critical for the modern battlefield, such as improved self-regulation, better attentional skills and enhanced situational awareness.

Working memory capacity and mental armor. Mind fitness, as we have operationalized it here, comprises

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mental faculties critical for military effectiveness, such as mental agility, emotion regulation, attention and situational awareness. Interestingly, the cognitive neuroscience construct of "working memory capacity" has also been linked to these faculties. Working memory capacity is the ability to maintain relevant information online while resisting interference from irrelevant information. Growing evidence suggests that working memory capacity is tied to the ability to engage in abstract problem-solving and counterfactual thinking. Recently, neuroscientists report that in addition to these "cold" cognitive processes requiring a high degree of mental flexibility and agility, "hot" emotional regulation processes also rely on working memory capacity.

While individuals differ in their baseline working memory capacity,

everyone's working memory capacity can be fatigued and degraded after engaging in highly demanding cognitive or emotional tasks. (See B.J. Schmeichel's "Attention control, memory updating, and emotion regulation temporarily reduce the capacity for executive control" in the *Journal of Experimental Psychology: General* which was published in 2007.) Conversely, working memory capacity can be improved and strengthened through training. Studies have shown that individuals with higher working memory capacity have better attentional skills, abstract problem-solving skills and general fluid intelligence (that is, the ability to use rather than simply know facts). They also suffer less from emotionally intrusive thoughts and are more capable of suppressing or reappraising emotions when required. In contrast, individuals with lower working memory capacity have poorer academic achievement, lower standardized test scores and more episodes of mind-wandering. They are more likely to suffer from post-traumatic stress disorder, anxiety disorders and substance abuse, and are more likely to exhibit prejudicial behavior toward personally disliked groups. (See "Working memory span tasks: A methodological review and user's guide" by A.R. Conway et al. in *Psychonomic Bulletin & Review* which was published in 2005.) Thus, working memory capacity corresponds to an individual's

success at willfully guiding behavior while overcoming cognitive or emotional distractions or impulsive tendencies. Warriors with higher working memory capacity are more likely to have better mind fitness and thus be better equipped for responding to the cognitive and emotional challenges that come from preparing for and experiencing deployment. These warriors are also more likely to maintain an effective level of performance when confronted by obstacles, setbacks and distractions, and return to their baseline functioning after being exposed to stressors or traumatic experiences. Nonetheless, all warriors (even those with higher working memory capacity) are likely to suffer from some degree of working memory capacity degradation through the deployment cycle because the stressors of this time period are so depleting of cognitive and emotional

resources. Moreover, an individual's position within the military command structure may exacerbate the problem because recent evidence suggests that being lower in a power hierarchy reduces working memory capacity. (See "Lacking power impairs executive functions" by P.K. Smith et al. in *Psychological Science* which was published in 2008.)

Thus, an important component of optimal combat readiness should be to maintain or increase baseline levels of working memory capacity, despite the increase in stressors over the deployment cycle. Because working memory capacity can be strengthened through training, performance on both cold cognitive processes and hot emotional regulation can be enhanced. Maintaining or enhancing warriors' baseline levels of working memory capacity could have cascading effects for effective decision making, complex problem solving and emotional regulation processes, all of which are heavily taxed over the deployment cycle and are crucial for mission effectiveness. In other words, training to improve working memory capacity may provide "mental armor" to protect against impending deployment-related degradation in mind fitness.

MMFT. Mindfulness-based Mind Fitness Training is a 24-hour course that is taught over eight weeks in groups of 20 to 25 service members. Mindfulness-based Mind Fitness Training is based on the well-established mindfulness-based stress reduction course known to improve attentional functioning and reduce the negative effects of stress. However, Mindfulness-based Mind Fitness

Training is tailored for the military predeployment training cycle, with real-world examples from the counterinsurgency environment that show how mind fitness skills can enhance performance and mission accomplishment. During the course, troops learn about the stress reaction cycle and its effects on the mind and body. They also learn how mind fitness training can boost resilience to stress. Most importantly, and unlike the Army's Battlemind training, Mindfulness-based Mind Fitness Training provides skills training through mind fitness exercises. These exercises are practiced 30 minutes a day. Some exercises build concentration by focusing on one object of attention, such as a particular body sensation. Others build situational awareness and non-reactivity through wider attention on internal and external stimuli. And some exercises use focused attention to reregulate physiological and psychological symptoms that develop from traumatic or stressful experiences. The exercises are incorporated into physical training and other mission essential tasks and completed during the duty day, in groups and/or individually. Thus, an important component of the course is engaging in Mindfulness-based Mind Fitness Training exercises each day.

We recently conducted a pilot study of Mindfulness-based Mind Fitness Training with a detachment of 31 Marine Reservists, who received the training before they deployed to Iraq. (In March 2009, they returned home from this deployment.) While some Marines resisted the effort required by the training, the initial exposure was relatively positive.

The entire detachment received training, and Mindfulness-based Mind Fitness Training's didactic information and group practices helped to socialize the concept. Once deployed, the Marines personalized their approach to the Mindfulness-based Mind Fitness Training exercises, differing in how they incorporated them into their daily routines. From their anecdotal reports during and after the deployment, it appears some Marines continued the exercises during their down time, some incorporated them into their physical fitness regimes, some employed them as part of their permission rehearsals and some employed them to keep themselves alert and focused while on missions. Many Marines reported using the exercises at bedtime, which they said helped them to quiet their minds, fall asleep faster and sleep more soundly.

Before and after Mindfulness-based Mind Fitness Training training (before they deployed), the Marines participated in a battery of behavioral tasks to measure their cognitive capabilities. We had predicted that the increase in stressors during predeployment training would degrade the Marines' cognitive performance. However, statistical analysis shows that the Marines who spent more time engaging in mind fitness exercises (on average, 10 hours outside of class) saw an improvement in their cognitive performance compared to Marines who spent less time engaging in the exercises (on average, two hours outside of class). (See "Examining the Protective Effects of Mindfulness Training on Working Memory Capacity and Affective Experience" by A.P. Jha et al. which was reviewed by *Emotion*.) Specifically, despite the real increase



Dr. Michael J. Roy conducts a demonstration of a life-like simulator that represents a new form of post-traumatic stress disorder treatment with SGT Lenearo Ashfordon in Washington, D.C., Sept. 16, 2008. (Photo by John Kruzell)

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in stressors during the predeployment period, the Marines who engaged in more mind fitness training maintained the same perceived stress level and preserved or even improved their working memory capacity over their initial baseline.

In contrast, the Marines who engaged in less mind fitness training experienced an increase in their perceived stress levels and the predicted decrease in their working memory capacity. This degradation in their working memory capacity produced test scores of working memory capacity on par with populations that have suffered psychological injuries such as post-traumatic stress disorder and major depression. (See “Working memory capacity and suppression of intrusive thoughts” by C.R. Brewin, and L. Smart in the *Journal of Behavioral Therapy and Experimental Psychiatry* which was published in 2005, “Reduced autobiographical memory specificity and post-traumatic stress: Exploring the contributions of impaired executive control and affect regulation” by T. Dalgleish et al. in the *Journal of Abnormal Psychology* which was published in 2008 and “Reduced specificity of autobiographical memory and depression: The role of executive processes” by T. Dalgleish et al. the *Journal of Experimental Psychology: General* which was published in 2007.) It is important to note that this degradation in working memory capacity occurred before deployment, and thus does not reflect the additional stressors of the deployment itself. The apparent costs of the predeployment context are striking, given that the intention of the predeployment training is to prepare service members physically, emotionally and cognitively for the stressors of deployment. Our findings highlight the potential importance of providing mind fitness training within the predeployment time period to buffer against working memory capacity depletion.

While we have not yet fully analyzed the data from their postdeployment cognitive behavioral testing, it is clear from a postdeployment survey that the Marines

continued to engage in mind fitness training and/or use the skills they learned while deployed. Sixteen percent of the Marines said that they “practiced regularly while deployed,” while 35 percent gave neutral responses and 48 percent said they did not practice regularly. In contrast, 26 percent of the Marines said that they practiced mind fitness exercises “after particularly stressful or traumatic experiences,” while 35 percent gave neutral responses and 38 percent said they did not. Perhaps more importantly, 54 percent of the Marines said that they “used the skills learned in this course downrange,” while 27 percent gave neutral responses, and the rest said they did not use Mindfulness-based Mind Fitness Training skills while deployed.

Thus, while only 16 percent practiced mind fitness exercises regularly during the deployment, more than a quarter used the practices to reregulate themselves after stressful experiences and more than half used Mindfulness-based Mind Fitness Training skills during the deployment. These findings suggest the need for adding more structured mind fitness exercise sessions into a unit’s daily schedule during deployment. They also highlight again the parallel to physical fitness: just as building muscle requires repetitive physical exercise, improving cognitive and emotional performance requires engaging in mind fitness exercises in a sustained, disciplined manner. While mind fitness skills are quickly and easily taught, they require ongoing commitment to develop and strengthen over time.

We acknowledge several limitations to this pilot study. Our cohort was a convenience sample, consisting of a detachment that agreed to receive training. There was no wait list or active control group, although we are currently gathering control group data for further analysis. We think this weakness was partially mitigated by our use of well validated cognitive behavioral instruments shown to be stable over time. This minimizes simply reflected measurement artifact. Nonetheless, the fact

that all Marines started with similar working memory capacity scores and that changes in their scores over time correlate, in a statistically significant way, with the amount of time spent engaging in mind fitness exercises highlights the need for further study. To this end, we have recently received funding from the Department of Defense to examine how mind fitness training can build resilience and combat readiness among Army Soldiers. The first study will compare Mindfulness-based Mind Fitness Training to the Army’s Battlemind program in a predeployment context. The second study will compare different versions of Mindfulness-based Mind Fitness Training in a non-deployment context, to see which version is most effective at producing optimal cognitive and psychological performance among warriors.

As this article has shown, mind fitness training can immunize against stress by buffering the cognitive degradation of stress inoculation training and by permitting more adaptive responses to and interpretation of stressors. Mind fitness training can also enhance warrior performance by cultivating competencies critical for today’s security environment. Finally, beyond its immediate effects for managing stress and enhancing mission performance, mind fitness training is protective: it builds resiliency and leads to faster recovery from cognitive degradation and psychological injury. While warriors may choose to engage in mind fitness exercises to optimize their performance downrange, the protective effects will still be accruing — likely leading to a decrease in psychological injury upon returning home. As a result, mind fitness training could reduce the number of warriors in need of professional help and thereby reduce caregiver burnout among Armed Forces’ chaplains and medical and mental health professionals. In other words, mind fitness training’s beneficial effects could continue long after the deployment is over, increasing the likelihood that warriors will be ready, willing and able to deploy again when needed.

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